IN THE SPECIFICATION:

Please amend the specification as follows:

[0011] Further, in the ball endmill of the present invention, the first radius of curvature is in the range of from 0.025D to 0.10D relative to the outside diameter D. If the first radius of curvature is smaller than 0.025D relative to the outside diameter D, a spacing gap between the first portions of the adjacent ball-nosed end cutting edges in vicinity of the axis of the ball endmill is reduced whereby performance of evacuation of cutting chips is ~~reduced~~ deteriorated. On the other hand, in the ball endmill of the present invention in which the first radius of curvature is not smaller than 0.025D relative to the outside diameter D of the ball endmill, the spacing gap between the first portions can be sufficient for improving the performance of evacuation of cutting chips.

[0012] Further, in the case where the first radius of curvature is smaller than 0.025D relative to the outside diameter D, the spacing gap between the first portions of the adjacent ball-nosed end cutting edges in vicinity of the axis of the ball endmill is reduced too much. The excessive reduction of the spacing gap, when each ball-nosed end cutting edge is ground by a grinding wheel in a grinding step, could

cause the grinding wheel to interfere with the adjacent ball-nosed end cutting edge. On the other hand, in the ball endmill of the present invention in which the first radius of curvature is not smaller than 0.025D relative to the outside diameter D, the spacing gap between the first portions can be sufficient for preventing the interference of the grinding wheel with the adjacent ball-nosed end cutting edge. Thus, it is possible to eliminate necessity of an excessively highly accurate control in the grinding step, leading to reduction in cost for machining the ball endmill.

[0024] Hereinafter, a preferred embodiment of the present invention will be described with reference to the drawings. View (a) of Fig. 1 is a front elevational view of a ball endmill 1 according to the embodiment of the invention, and view (b) of Fig. 1 is an enlarged side view ~~showing in enlargement~~ <u>of</u> the ball endmill 1 as seen in a direction indicated by arrow 1(b) in view (a) of Fig. 1.

[0029] The peripheral cutting edges 5a-5c are cutting edges formed ~~in~~ <u>on</u> an outer periphery of the tool body 2. Each of the three peripheral cutting edges 5a-5c is provided ~~by~~ <u>with</u> an edge at which a corresponding one of the chip evacuation flutes 4a-4c intersects with a corresponding one of the lands

7a-7c each formed in the outer periphery of the tool body 2 and having a predetermined width.

[0030] The ball-nosed end cutting edges 6a-6c are formed in a distal end portion (left side portion as seen in view (a) of Fig. 1) of the blade portion 3, and describe a semi-spherical-shaped locus while the ball endmill 1 is being rotated. Like each of the three peripheral cutting edges 5a-5c, each of the three ball-nosed end cutting edges 6a-6c is provided ~~by the~~ with an edge at which a corresponding ~~chip~~ one of the chip evacuation flutes 4a-4c intersects with a corresponding one of the lands 7a-7c. The ball-nosed end cutting edges 6a-6c are contiguous to the respective peripheral cutting edges 5a-5c.

[0032] Fig. 2 is a set of schematic views schematically showing the distal end portion of the ball endmill 1, wherein view (a) of Fig. 2 is the schematic view obtained by projecting the ball-nosed end cutting edges 6a-6c onto a plane, and view (b) of Fig. 2 is the enlarged schematic view ~~showing in enlargement~~ of a part of view (a) of Fig. 2. It is noted that an outer peripheral portion of each ball-nosed end cutting edge 6 is not illustrated in view (b) of Fig. 2.

[0036] Further, in the case where the first radius R1 of curvature is smaller than 0.025D relative to the outside

diameter D, the spacing gap between the first portions 6a1-6c1 of the adjacent ball-nosed end cutting edges 6a-6c in vicinity of the axis O of the ball endmill 1 ~~is reduced~~ becomes too small. ~~The reduction of~~ Because the spacing gap is too small, when each ball-nosed end cutting edge 6a-6c is ground by a grinding wheel in a grinding step, could cause the grinding wheel to interfere with the adjacent ball-nosed end cutting edge 6a-6c. On the other hand, in the ball endmill 1 of the present embodiment in which the first radius R1 of curvature is not smaller than 0.025D relative to the outside diameter D, the spacing gap between the first portions 6a1-6c1 can be sufficient for preventing the interference of the grinding wheel with the adjacent ball-nosed end cutting edge 6a-6c. Thus, it is possible to eliminate necessity of an excessively highly accurate control in the grinding step, leading to reduction in cost for machining the ball endmill 1.

[0040] It is preferable that the outside diameter D is not smaller than 1 mm. If the outside diameter D is smaller than 1 mm, the spacing gap between the first portions 6a1-6c1 of the adjacent ball-nosed end cutting edges 6a-6c in vicinity of the axis O of the ball endmill 1 is excessively reduced. The reduction of the spacing gap, when each ball-nosed end cutting edge 6a-6c is ground by the grinding wheel in the grinding step, could cause the grinding wheel to interfere with the

adjacent ball-nosed end cutting edge 6a-6c. On the other hand, with the outside diameter D being not smaller than 1 mm, the spacing gap between the first portions 6a1-6c1 can be sufficient for preventing the interference of the grinding wheel with the adjacent ball-nosed end cutting edge 6a-6c. In the present embodiment, the outside diameter D is 12 mm, the first radius R1 of curvature is 0.0625D (0.75 mm) relative to the outside diameter D (D = 12 mm), and the first radii R1 of curvature of the first portions 6a1-6c1 of the respective ball-nosed end cutting edges 6a-6c are provided by respective radii of curvature that are equal to each other.

[0041] Further, each of the first portions 6a1-6c1 of the respective ball-nosed end cutting edges 6a-6c is defined by a central angle θ. Here, as shown in Fig. 2(a), the central angle θ is an angle between a first line connecting a center of the first radius R1 and the axis O and a second line connecting the center of the first radius R1 and the connection point P.

[0042] It is preferable that the central angle θ is in a range of from 60° to 120°. If the central angle is smaller than 60°, the length of the first portion 6a1-6c1 of each ball-nosed end cutting edge 6a-6c as measured from its starting end (the axis O of the ball endmill 1) to its

terminal end (connection point P) ~~is made~~ becomes too small, it is not possible to effectively utilize the effect of the invention that the direction of the cutting resistance (cutting torque) exerted by the workpiece and acting on the first portion 6a1-6c1 is caused to vary. On the other hand, in the ball endmill 1 of the present embodiment in which the central angle θ is not smaller than 60°, the length of the first portion 6a1-6c1 of each ball-nosed end cutting edge 6a-6c ~~can be made large~~ becomes sufficiently large for utilizing the effect of the first portion 6a1-6c1 which varies the direction of the cutting resistance (cutting torque).

[0062] For example, in the above-described embodiment, the ball endmill 1 is a three-flute endmill having three teeth each provided ~~by~~ with the peripheral and ball-nosed end cutting edges 5a-5c, 6a-6c. However, the ball endmill 1 is not necessarily limited to such a ~~detail~~ specific structure, but may be constructed to have two teeth or four or more teeth, for example. In this case, too, as in the above-described embodiment, the direction of the cutting resistance (cutting torque) exerted by the workpiece 20 and acting on the ball endmill 1 can be varied, thereby making it possible to restrain vibration of the ball endmill 1.